**I Claim:**

1. An apparatus for operably coupling a plurality of distributed power generators to an electrical power grid, the apparatus comprising:

   a charge/discharge controller that transfers energy generated by the plurality of distributed power generators to the power grid, and

   an adaptive controller that directs, based upon at least one selected parameter, when the charge/discharge controller transfers energy generated by at least one of the plurality of distributed power generators to the electrical grid.

2. The apparatus according to claim 1, further including a neighborhood controller having the charge/discharge controller housed therein, wherein the neighborhood controller interfaces with the power grid.

3. The apparatus according to claim 2, wherein the neighborhood controller provides the combined energy generating capacity of the plurality of distributed power generators to the power grid.

4. The apparatus according to claim 2, wherein the neighborhood controller enables bulk energy transactions between the plurality of distributed power generators and the power grid.

5. The apparatus according to claim 4, wherein the neighborhood controller can provide blocks of energy large enough to enable transactions on the wholesale electricity market.

6. The apparatus according to claim 1, wherein at least one distributed power generators is located proximal to an energy user.

7. The apparatus according to claim 1, wherein the charge/discharge controller includes circuitry for transferring energy from the power grid to an energy user located proximal to at least one distributed power generator based upon the at least one selected parameter.

8. The apparatus according to claim 1, wherein the charge/discharge controller includes circuitry for transferring energy from at least one of the plurality of distributed power

generators to an energy user.

9. The apparatus according to claim 1, further including an energy storage device and wherein the charge/discharge controller includes circuitry for transferring energy generated by at least one of the plurality of distributed power generators to the energy storage device.

10. The apparatus according to claim 9, wherein the adaptive controller directs the charge/discharge controller to transfer energy to the storage device based upon the at least one selected parameter.

11. The apparatus according to claim 2, wherein the neighborhood controller includes an energy storage device.

12. The apparatus according to claim 1, wherein the charge/discharge controller includes circuitry for transferring energy between an energy storage device and the power grid.

13. The apparatus according to claim 1, wherein the charge/discharge controller includes circuitry for transferring energy from an energy storage device to an energy user.

14. The apparatus according to claim 1, wherein the adaptive controller directs the charge/discharge controller based upon a parameter selected from the group consisting of: energy price, energy load, current weather, and available energy.

15. The apparatus according to claim 1, wherein the adaptive controller includes a neural network for directing the charge/discharge controller to transfer energy to the electrical grid.

16. The apparatus according to claim 15 wherein the neural network includes a pattern database for storage and retrieval of profiles based upon measured parameters.

17. The apparatus according to claim 16 wherein the stored parameters are selected from the group consisting of: energy load, current weather, available energy, and energy price.

18. The apparatus according to claim 16 wherein the neural network includes a pattern recognizer for correlating a current measured parameter with a selected profile from the pattern database.

19. The apparatus according to claim 18 wherein the neural network includes a control law generator for directing the charge/discharge controller based upon the correlation between the current measured parameter and the selected profile.

20. The apparatus according to claim 15, wherein the neural network includes a processor executing a set of instructions that maximize the profit obtained by selling energy to the power grid.

21. An apparatus for operably coupling a distributed power generator to an electrical power grid, the apparatus comprising:

a charge/discharge controller that transfers energy generated by the distributed power generator to the power grid, and

an adaptive controller that directs, based upon at least one selected parameter, when the charge/discharge controller transfers energy generated by the distributed power generator to the electrical grid.

22. The apparatus according to claim 21, further including an energy storage device and wherein the charge/discharge controller can transfer to and retrieve energy from the energy storage device.

23. The apparatus according to claim 22, wherein the adaptive controller directs the charge/discharge controller to transfer energy to the storage device based upon the at least one selected parameter

24. The apparatus according to claim 21, wherein the adaptive controller directs the charge/discharge controller based upon a parameter selected from the list consisting of: energy price, energy load, current weather, and available energy.

25. The apparatus according to claim 21, wherein the adaptive controller includes a neural network for directing the charge/discharge controller to transfer energy to the electrical grid.

26. The apparatus according to claim 25, wherein the neural network includes a pattern database for storage and retrieval of profiles based upon measured parameters.

27. The apparatus according to claim 26, wherein the stored parameters are selected from the group consisting of: energy load, current weather, available energy, and energy price.

28. The apparatus according to claim 26, wherein the neural network includes a pattern recognizer for correlating a current measured parameter with a selected profile from the pattern database.

29. The apparatus according to claim 28, wherein the neural network includes a control law generator for directing the charge/discharge controller based upon the correlation between the current measured parameter and the selected profile.

30. The apparatus according to claim 21, wherein the neural network includes a processor executing a set of instructions that maximize the profit obtained by selling energy to the power grid.

31. A method for coupling a plurality of distributed power generators to an electrical power grid, comprising:

transferring energy from the plurality of distributed power generators to a charge/discharge controller, and

directing, based upon at least one selected parameter, when to transfer energy from the charge/discharge controller to the electrical grid

32. The method according to claim 31, further comprising the step of determining, based upon at least one selected parameter, whether to transfer energy from the electrical grid to an energy storage device through the charge/discharge controller.

33. The method according to claim 31, further comprising the step of determining, based upon at least one selected parameter, whether to transfer energy from the electrical grid to an energy user through the charge/discharge controller.

34. The method according to claim 31, further comprising the step of determining, based upon at least one selected parameter, whether to transfer energy from at least one of the distributed power generators to an energy storage device through the charge/discharge controller.

35. The method according to claim 31, further comprising the step of determining, based upon at least one selected parameter, whether to transfer energy from at least one of the distributed power generators to an energy user through the charge/discharge controller.

36. The method according to claim 31, further comprising the step of determining, based upon at least one selected parameter, whether to transfer energy from an energy storage device to an energy user through the charge/discharge controller.

37. The method according to claim 31, further comprising the step of measuring the current value of the at least one selected parameter.

38. The method according to claim 37, further including the step of correlating the measured parameter with a selected profile.

39. The method according to claim 38, wherein the step of correlating the measured parameter with the selected profile further includes the step of optimizing the operation of the charge/discharge controller using nonlinear algorithms.

40. The method according to claim 38, wherein the selected profile is stored in a pattern database.

41. The method according to claim 38, wherein the adaptive controller directs the charge/discharge controller based upon the correlation between the measured parameter and the selected profile.

42. The method according to claim 31, wherein the charge/discharge controller is housed within a neighborhood controller that interfaces with the power grid.

43. The method according to claim 41, wherein the neighborhood controller provides the combined energy generating capacity of the plurality of distributed power generators to the power grid.

44. The method according to claim 31, wherein the at least one selected parameter is selected from the group consisting of: energy price, energy load, current weather, and available energy.